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ABSTRACT

The Innovative Approaches Research Project (IARP) develops instructional models for language minority students. The project focuses on dropout prevention, instruction of exceptional students, math and science instruction, and literacy. IARP implemented four model programs: (1) Partners for Valued Youth: Dropout Prevention Strategies for At-Risk Language Minority Students, in which at-risk, limited English proficient 7th grade students tutored kindergarten and elementary students; (2) AIM for the BESt: Assessment and Intervention Model for Bilingual Exceptional Students, which initiated problem-solving techniques to enable classroom teachers to deal with individual language minority students before referral to special education programs; (3) Community Knowledge and Classroom Practice: Combining Resources for Literacy Instruction in which teachers collaborated in an after-school study group to change the structure of classroom instruction and to develop units of study using home community resources and incorporating content areas relevant to the experiences of the students; and (4) Cheche Konnen: Collaborative Scientific Inquiry in Language and Minority Classrooms which placed students in the role of scientists who posed questions, formulated hypotheses, and built theories and collaborated with teachers and other students to collect, analyze, and interpret data to present in reports. The models are generalizable to other settings and groups. These themes are emphasized: (1) restructuring schooling to open up communication within the school community; (2) using participatory and cooperative teaching and learning approaches; and (3) providing challenging instructional content that is culturally and personally relevant to students. This document includes a 36-item bibliography. (ALL)

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Collaboration in Teaching and Learning

Findings from the Innovative Approaches Research Project

Findings from the Innovative Approaches Research Project

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ASSURING THE ACADEMIC SUCCESS OF LANGUAGE MINORITY STUDENTS: COLLABORATION IN TEACHING AND LEARNING

THE INNOVATIVE APPROACHES RESEARCH PROJECT

INTRODUCTION

The large numbers of Americans who come from non-native English language backgrounds together with the recent surge in immigration from Central America, the Caribbean Basin, and Southeast Asia have greatly increased the number of students enrolled in our nation's schools who have limited oral and written communication skills in English. As a result, the provision of effective instruction to language minority students is one of the most critical challenges confronting today's schools (Lara & Hoffman, 1990; MIT, 1990).

This challenge comes at a time when schools are in the midst of instructional reform aimed at meeting educational demands imposed by the social, economic, and technological changes that have occurred in the decade of the eighties. Competition from abroad and the occupations created by new advanced technology industries have produced demands for higher literacy and achievement in science and mathematics. Moreover, structural shifts in the economy, along with technological advances in computer and electronic automation, have altered the nature of the job market and increased the importance of literacy in the workplace. The implications of these changes are that persons entering the workforce must be prepared with a higher level of literacy skills and skills in science and mathematics than needed in the past (De LaRosa & Maw, 1990; U.S. Equal Employment Opportunity Commission, 1986).

Schools today thus face enormous pressures to raise standards and to change the objectives of schooling in ways which incorporate activities and content designed to develop oral and written communication and critical-thinking skills. Evidence suggests that school reforms introduced in the 1980s to meet these ends are beginning to have an impact. However, there is rising concern that the school reform movement may serve to widen the already substantial gap between the achievement of majority students and those from minority groups unless special steps are taken (McPartland & Slavin, 1990). In response to this concern, a renewed emphasis is being placed on strengthening programs serving language minority students whose academic progress is jeopardized by their economic status and/or conflicts between the language and culture of the schools and the one found in the home and community.

The Innovative Approaches Research Project (IARP), funded by the U.S. Department of Education, Office of Bilingual Education and Minority Languages Affairs, is one important response to the challenge; it is part of an overall effort to address the special issues faced by schools in effectively educating language minority students. The focus of the IARP is on developing innovative instructional and intervention models for language minority students in four topic areas: dropout prevention, instruction of exceptional students, instruction in science and math, and instruction in literacy. In the project, one model within each of these four topic areas was selected for implementation within programs serving language minority students. Priority was given to those models that were practical and that had a foundation in research in the topic areas and in research related to language and the processes of teaching and learning.

The models selected and implemented for two academic years were:

- **Partners for Valued Youth:**
  Dropout Prevention Strategies for At-Risk Language Minority Students;
- **AIM for the BESt:**
  Assessment and Intervention Model for Bilingual Exceptional Students;
- **Community Knowledge and Classroom Practice:**
  Combining Resources for Literacy Instruction; and
- **Cheche Konnen:**
  Collaborative Scientific Inquiry in Language Minority Classrooms.

The objectives in the research and demonstration of the IARP models were to:

- examine promising "innovative" approaches for the education of language minority students in the four topic areas;
- examine and document the implementation of the instructional/intervention approaches within school settings;
- conduct research on the effectiveness of the approaches;
- provide information to practitioners, researchers, and policymakers at various stages of implementing the models;
- publish materials and guidelines for use in the replication of the models; and,
- develop products that allow for the replication of the models.

The ultimate goal of the IARP is to offer educators new but tested alternatives for instructing language minority students that would raise academic achievement levels and that would assist educators in keeping "at risk" language minority students in school.

The implementation of each model was a collaborative effort. The collaboration involved researchers, administrators, and teachers who worked together in the classrooms and schools and who jointly shaped refinements in the processes and procedures of the individual models. The interaction between researchers and teachers led to a dynamic partnership; together they refined the interventions so that they achieved the best fit within the context and needs of the implementing classrooms.

Largely due to this collaboration, the research and demonstration phase of the models was particularly informative and led to important insights about the structure of schooling and about effective instructional approaches for language minority students.

Although the IARP models were implemented in specific school environments with specific language minority populations, it was expected that each model and/or its component parts would be generalizable to other settings and applicable to language minority and non-language minority students in other communities. In order to ensure that the results of the IARP models would be replicable, both the research and the demonstration aspects of each model were carefully documented to provide insights on how to implement the models in other settings and with different populations. Quantitative and qualitative data were collected in order to examine the strengths and weaknesses of the innovations for both teachers and students. Interestingly, in reviewing the findings of all four IARP models, it became clear that despite the diversity of approaches and differences in focal areas, there was considerable commonality among the models. The common themes underscore the importance of reevaluating the traditional organization of schooling and emphasize the value of instructional approaches and interventions that redefine traditional teacher/student relationships. Each model, as a specific example of these common themes, presents challenging ideas about more effective ways to structure schooling and the teaching/learning process. It is in these aspects that the IARP has fulfilled its goal of identifying innovations that can be used to successfully address the needs of language minority students.

Briefly, the common themes identified in the four models involved emphases on:

- the need for restructuring schooling to open up communication within the school community;
- the value of using participatory and cooperative teaching and learning approaches; and,
- the importance of providing challenging instructional content that is culturally and personally relevant to students.

To persons familiar with the educational literature, these kinds of emphases are not all new: they reflect several issues and approaches that have received much discussion. However, the importance of the IARP models lies in the fact that program elements representing a specific and unique integration of these emphases were found within each of the models. Looking across all four models, the findings have implications for the structuring of effective instructional programs.

Below, we describe the IARP models, noting their design and goals and highlighting the principal findings, especially the effects of the models on students. Next, we outline the common themes found in the innovations which indicate important characteristics of effective programs for language minority students, and discuss significant elements within each model that exemplify these common themes.

OVERVIEW OF THE IARP RESEARCH AND DEMONSTRATION MODELS

The goal for each IARP research and demonstration model was to provide educators of language minority students with effective instructional/intervention models which were practical, had a base in current research findings, and could be replicated in a variety of school settings. The models were intended to enhance existing programs serving language minority students; additionally, the models represented significant educational innovations. Although similar approaches may have been tried before, the configuration of the models and the structure of their implementation, together with their focus on language minority students, made the IARP models unique. This discussion is intended to capture the spirit and significance of each model, to describe the major components and design features of the models, and to highlight their findings over the two year demonstration phase of the IARP.

PARTNERS FOR VALUED YOUTH: DROPOUT PREVENTION STRATEGIES FOR AT-RISK LANGUAGE MINORITY STUDENTS

Design and Goals

Administrators in two school districts in the southwest U.S. made a daring decision. They selected one hundred Hispanic 7th graders who were limited English proficient, had below grade-level achievement, were disciplinary referrals, and irregular school attenders, and gave them the responsibility of tutoring elementary school students. Over the school year, the tutors established strong personal relationships with their tutees and had the satisfaction of seeing the tutees improve their basic skills. Moreover, after a year of tutoring, ninety-five of these "at-risk" tutors began to attend school regularly; they found a new respect for themselves and developed goals that included staying in school.

This tutoring program, which had such remarkable results, was implemented through the IARP "Partners for Valued Youth" (PVY) model. In this model, the selected student tutors worked with three or more students in kindergarten through fourth grade for four hours a week. The tutees were students who needed to improve their basic skills and who required individualized attention; in most cases, they too were limited English proficient.

While cross-age tutoring was the central component of the PVY model, other key ingredients were included to provide additional support to the student tutors. The students were paid a minimum wage for their efforts, received course credit, and were recognized at special events. To help provide common experiences, tutors and tutees periodically took field trips in the community. Also, prominent individuals from the community who had some common link with the tutors (e.g. having left school or having thought about it) were invited to discuss their occupations and share relevant personal experiences. The final critical ingredient in the program was parent involvement. Parents were kept informed about the program and were encouraged to support their child's involvement in school. Home

visits, parent conferences, and social gatherings — such as dinners — were used to involve parents more actively.

In implementing the program, perhaps the most crucial element was the smooth integration of the cross-age tutoring component into the life of both the junior high and the elementary school students. This integration was the responsibility of the coordinating teacher who oversaw the tutors, helped them prepare lessons, and arranged the tutoring sessions with the elementary teachers who accepted the tutors into their classrooms.

In evaluating the effectiveness of the model, the researchers used a quasi-experimental approach to test whether the intervention increased students' academic achievement, improved attitudes toward school, and reduced the dropout rate of the student tutors as compared to control group students. Both the student tutors and the control group students were reading below grade level and were classified limited English proficient as defined by Texas guidelines.

Qualitative and quantitative data were collected for student tutors, tutees and control group students in order to analyze the effectiveness of the approach and to identify the critical elements of the model that would be necessary for replication. The database for the model included student tutor and student tutee demographic data, school attendance data, achievement data, language proficiency data, self-concept data, quality of school life data, teacher/coordinator interview and survey data, and parent survey data.

In addition, in an effort to understand the effects of the intervention at a micro level, the researchers conducted case studies of four student tutors. The students were randomly selected from a pool of twelve students, participants in a summer institute, the Valued Leaders Program. The case study data included descriptive student background information, group and individual student interviews, parent survey information, school context data, tutee teacher interviews, and site evaluation information. The purpose of each case study was to "find out who these people (student tutors) are, what they think, what perceived and real changes have occurred, what their family and school life is like" (Supik, 1990).

Principal Findings

The researchers noted that two critical components affected the success of the program. First, the monetary compensation motivated the tutors to take their tutorial responsibilities seriously. Second, the tutors quickly learned to value the esteem they received from the tutees. The recognition that they were making a contribution to the learning of a younger student had a strong positive impact on the tutors' own attitudes and academic achievement.

In effect, the tutors gained a new respect for themselves through the realization that they possessed important skills that could be shared. Thus the model helped to make continued school attendance meaningful to these "at risk" students by building their self-image. In turn, these attitude changes led to increases in the students' levels of academic achievement and to decreases in student

truancy and disciplinary referrals. In fact, only one percent of the tutors dropped out of school as compared to twelve percent of comparison group students.

A number of other indicators demonstrated that this intervention had a positive effect on the students who took part in the program. The experience gave the students new-found goals which made staying in school more salient for them: tutors developed career goals that included becoming teachers, doctors, law enforcement officers, lawyers, architects, and designers. Also, data from the second year of the implementation suggest that many of the student tutors started to read independently; several substantially improved their grade point averages; and some began to make the honor roll regularly. Parents noted that their children began to show a better attitude toward school and began taking on more responsibilities at home with their siblings. One mother commented about her daughter: "She studies more than before she was in the tutoring program...She helps more with household duties...[and] reads often to prepare tutoring materials."

Within the schools as well important changes in attitude occurred. Teachers in the middle and elementary schools began to show greater confidence in the student tutors' academic abilities and academic potential and so students received additional reinforcement for their efforts through the respect they gained in the eyes of the teaching staff.

The findings thus showed that Partners for Valued Youth had a significant impact. It provides a model for drawing on the resources of "at risk" students and for demonstrating to the students themselves, to the tutees, and to the school staff the meaningful contributions that these students can make. In the course of this demonstration, the model led "at risk" student tutors to redefine their attitudes toward themselves and schooling, and toward their own abilities and goals.

AIM FOR THE BESt: ASSESSMENT AND INTERVENTION MODEL FOR THE BILINGUAL EXCEPTIONAL STUDENT

Design and Goals

The "AIM for the BESt" model was designed as a comprehensive service delivery system. The model was built upon two complementary premises: First, that improving academic achievement and decreasing the inappropriate referral of language minority students to special education programs requires coordination across all programs within a school setting, as opposed to isolated program- or personnel-specific interventions; and, second, that the academic success of exceptional language minority students demands a supportive environment where school personnel across all programs in the school work in partnership to provide instruction that is appropriate, challenging, and linguistically and culturally relevant.

The AIM for the BESt model was implemented in four elementary schools (two K-2 campuses and two 3-5 campuses) in a small urban community in southern Texas where the majority

of the approximately 700 students per school were Mexican American. The specific goals of the innovation were:

- to reduce the inappropriate referral of language minority students to special education programs and to assist teachers in addressing the special needs of language minority students within mainstream classrooms;
- to ensure that assessment procedures used for the purpose of determining special education eligibility are non-biased; and,
- to improve the academic achievement of language minority students by introducing teachers to promising instructional practices.

To meet these goals, the researchers collaborated with teachers and other school resource personnel in introducing the components of AIM for the BESt. Central to the model was the formation of school-based problem-solving teams, termed Student/Teacher Assistance Teams (S/TATs); these addressed the first goal of the model: reducing the inappropriate referral of language minority students to special education. The teams are composed of resource personnel (e.g., the school psychologist) and mainstream and bilingual teachers who are elected by their peers. The teams meet on a regular basis to discuss particular cases of students with learning and/or behavioral problems referred to them by their teachers.

The S/TAT works with teachers in resolving problems they encounter in instructing individual students. The procedure is triggered by a classroom teacher who identifies a student with a particular problem and requests the assistance of the S/TAT. The S/TAT members are given background information, a description of the behavior and/or learning problem, and an account of how the teacher has handled the problem in the classroom; based on a review of this information and a subsequent meeting with the child's teacher, the S/TAT suggests some alternative approaches for the teacher to remediate the problem with the student. The S/TAT, the teacher, and other appropriate personnel in the school would work together for whatever period of time required to implement and follow up on the recommended plan of action. When necessary — only after all apparent alternatives for resolving the problems within the classroom have been exhausted — the team refers students to specialists for further assessment and potential placement in special education.

The second goal of the AIM for the BESt model, ensuring that assessment procedures were non-biased, was achieved through the use of Curriculum Based Assessment (CBA) techniques. CBA was used to assess the literacy skills of language minority children referred to special education. Through CBA, students' instructional needs were determined on the basis of the match between their achievement levels and the curriculum materials being used.

The third goal, promoting improved academic achievement of students, was addressed by providing workshops and follow-up assistance to teachers in the use of Shared Literature and the Graves Writing Workshop. The Shared Literature component was implemented in the first year; the Graves Writing Workshop was put into place in the second year. These two interactive instructional strategies involve the child and the teacher in a variety of meaningful literacy tasks.

Within Shared Literature, activities are focused on reading and listening skills; students in Shared Literature classrooms read acclaimed children's literature, become familiar with individual authors and illustrators, and learn the elements of story structure. Through the Graves Writing Workshop children improve their writing skills by learning to collaborate with each other and with their teacher in communicating their ideas in writing. Students write, work together in critiquing, rewriting, and editing their products, and finally collaborate in publishing their work for the class and/or school/library. As a consequence of this process, students learn to express ideas, to clarify and refine them, and to record them in a variety of genres.

Principal Findings

The research design used to evaluate the effectiveness of the model was quasi-experimental with components of the model being implemented in different schools at different times to compare the effect of the interventions that were part of this model: S/TAT, Curriculum Based Assessment, and the use of the effective instructional approaches (Shared Literature and Graves Writing Workshop).

The S/TAT component proved effective in two ways. S/TAT teams provided a valuable resource to teachers working with language minority students and to school staff involved in assessing students' needs. For about 75% of the cases considered over two years of implementation, the S/TATs were able to help teachers resolve specific problems without referral to special education. In addition, the S/TAT provided other benefits. It offered a procedure for effective decision-making and also for needs assessment. The researchers noted "that the process helps identify problem areas or training needs that, if addressed, can help school personnel deal more effectively with students' learning and behavioral problems."

The findings of the demonstration showed that the second component of the model, the Curriculum-Based Assessment (CBA), was useful in assessing language minority students' literacy skills, although further elaboration and study of this aspect of the model was determined to be needed. In the model, diagnostic specialists in each school received training and support in the use of CBA procedures in both the native language and English. However, the findings indicated that training classroom teachers to conduct assessments would be a necessary step for the effective implementation of this aspect of the program.

Implementation of the two instructional innovations, Shared Literature and Graves Writing Workshop, was observed as having a positive impact on students. Teachers found that the children became genuinely engaged in their learning and that students' reading vocabulary, reading comprehension, and oral and written proficiency improved through participation in the program. For example, students who could not or would not write at the beginning of the school year improved dramatically by the end of the year.

The two instructional approaches also changed students' perceptions of their own abilities. The most handicapped student in one class proudly referred to herself as an author of poetry. One young man, who early in the school year had refused to write, wrote and then co-authored a sequel

to his book, Hamburger Wars. In addition, there were general improvements in the students' self-confidence and self-esteem that were attributed to the new assessment and instructional approaches used in the model.

Finally, the AIM for the BESt model had additional important benefits for the schools. Due to the collaborative nature of the model, in which mainstream teachers, bilingual teachers, and resource staff worked together and shared information, the implementation of the model enabled teachers and staff to understand more fully the special needs of language minority students. The staff in general became aware of the need to take a student's language and home background into consideration when making assessments and planning instruction.

Community Knowledge and Classroom Practice: Combining Resources for Literacy Instruction

Design and Goals

"All communities contain a wealth of knowledge and skills which can be recognized and used by schools to facilitate instruction." This statement expresses the philosophy of the project, "Community Knowledge and Classroom Practice: Combining Resources for Literacy Instruction." The collaborators of the project utilized the "funds of knowledge" available in the community to engage language minority students in "authentic" literacy activities. The goal of the project was to create instructional settings where students are immersed in literacy activities that are culturally appropriate and intellectually challenging.

Based on both ethnographic research and education theory, the model began with four basic questions:

1. What is the nature of literacy instruction for language minority students?
2. How "literate" is the student's home environment? Might it be a source of instructional materials?
3. What are ways of encouraging the use of more robust approaches to teaching literacy?
4. What would be the likely outcomes if these approaches were implemented?

To answer these questions, the researchers observed fourth, fifth, and sixth grade classrooms in the southwestern United States. A complementary ethnographic study of the students' home environments was also undertaken. Following this initial phase, a teachers' special after-school study group was begun in which teachers worked together to re-examine their approaches to teaching literacy. Concurrent with this introspection and refinement of approach, the researchers observed classrooms where teachers were trying out new strategies, techniques and materials that they had developed through the study group work sessions. Overall, approximately 90 students, 12 teachers, and 28 families were involved in the various aspects of the study.

Research Issue: Teaching Styles Before the Model

The research collaborators conducted approximately 130 classroom observations in grades 4, 5, and 6 in two schools, one the implementing school and the other a comparison school. The purpose of the observations was to gain a better understanding of the instructional practices used to teach literacy (Moll, 1989a). Although full-fledged case studies of individual classrooms were not conducted, the observations were collectively used and analyzed as a case study to draw conclusions about the instructional elements that characterize literacy practices in the schools. The major conclusions drawn from the classroom observations were the following:

- Instruction is teacher-centered rather than student-centered;
- Teachers rely on basal readers;
- Student writing is "limited generally to workbooks or dittos, spelling drills, or copying dictionaries;"
- Writing themes are usually selected by teachers and are often based on topics in the basal readers;
- Instruction is bilingual; and
- Curriculum being taught is usually at a low level.

The research collaborators concluded that not only was the curriculum rote and reductionist but that instruction rarely included activities that drew on the outside community (Moll, 1989c). "Schools, more specifically classrooms, are not organized to take full advantage of the household's funds of knowledge, of their plentiful social capital" (Moll, 1989b, p. 4-5).

Research Issue: The Literacy Resources Within the Community

The ethnographic study of twenty-eight families in a working-class community focused on understanding the origins and transmission of knowledge and skills within the households and on the nature of literacy activities within these home environments. Working class households, say the researchers, are reservoirs of knowledge in various domains. The findings of the ethnographic study showed that an individual household typically functions within a network of households of friends and relatives. Many of the needed services to be obtained (e.g., child care) or tasks to be carried out (e.g., plumbing, car repair) are accomplished through obtaining the assistance of one or more persons from within this network of household relationships. From these findings, the researchers drew conclusions related both to the structure and the content of the home community. With regard to structure, an important characteristic was the highly interactive nature of the household; that is, sources of knowledge, services and assistance for the homes studied were found within the network of social relationships. These sources serve as important supports for the individual household's survival. With regard to content, the network of sources of knowledge were found to consist of persons with expertise in many different areas, e.g., plumbing, carpentry, child care, finances, among others. Taken jointly, the interactive network in which the households operate and the various areas of expertise available within the network were characterized by the research collaborators as "funds" of knowledge.

The research collaborators present case studies to illustrate the "fluid reality of the households ... within which the experiences of children must be understood" (Moll, 1989a, p. 11). The data, they indicate, has extended:

> understanding of the community as a resource and of how to apply that resource to educational practice. Our analysis of households' funds of knowledge can help to re-define Hispanic families for educators and others ... involved in education and transform their reactions to these families. The idea that these families are somehow devoid of abilities and skills is simply erroneous. ... From our perspective, these families represent a major social and intellectual resource for the schools (Moll, 1989b, p. 28).

Research Issue: Using the Community Resources within the Classroom

Based on the findings of the household case studies, the researchers in collaboration with the teachers next sought effective ways to shape classroom practice. These findings justified two types of innovation. First, they supported structural modifications involving a change from teacher-centered classroom interaction to more student-centered interaction patterns. In student-centered classroom structures students and teacher share in the transmission of knowledge; this parallels the reciprocal transmission of knowledge characteristic of homes in the ethnographic study. The findings also supported changes in curriculum content such that the "funds of knowledge" available in the students' households could be brought into the classroom and utilized to promote student learning. The linkage between the home community and the school heightens student interest by making the classroom content more relevant to the students' experience.

In order to help bring about these changes, the research collaborators offered the teachers "strategic assistance" in developing new approaches to teaching literacy, sharing with them the suggestions developed out of the ethnographic study. At this stage, the goal was to persuade teachers to use the "funds of knowledge" available in the community and to engage their students in "authentic" literacy activities, that is, activities relevant to their own experience.

The concept of an after-school "lab" or "teacher study group" evolved as a strategy to accomplish this curricular reform. The researchers invited interested teachers to join a study group where they could share ideas, information, and questions. The teachers set the agenda and spent time reflecting on their own teaching practice. In doing so, the teachers created a supportive environment where they analyzed instruction, planned activities, and addressed practical concerns. Over time, the teachers became increasingly interested in using ideas suggested by the ethnographic research as a basis for curricular innovation. Thus in the second year emphasis shifted to exploring ways teachers could incorporate the rich community resources into their teaching, and supporting the teachers as they developed their own network for change within their classrooms.

One outcome of the teacher study group was the design of a series of literacy modules or activities that used the findings from the household study. A particularly successful module was one that focused on issues involved in construction. Implemented in a sixth grade classroom with 27 students, the class first conducted library research on historical buildings and methods of construction. Next, they built model structures and wrote brief essays to describe their models. Later, the class invited members of the community, each of whom had a different set of relevant construction skills. In all, these activities created many opportunities for students to write and think and for community members to contribute to classroom instruction. The teachers, whom the researchers believe were the true catalysts for change, became more thoughtful about the needs of language minority students and more attuned to the ways their classroom practice could be shaped by the resources of the culture.

Principal Findings

The researchers reported important outcomes of the two years of implementation of the Community Knowledge and Classroom Practice model. Overall, the approach:

- created a situation where the rich community resources were acknowledged and utilized by teachers within the classroom setting;
- increased the cultural relevance of instruction for language minority students;
- created collaborative relationships among teachers, students, and community members; and,
- increased the pride of students in themselves, their parents and their community.

The researchers pointed out the need to have teachers become "active intellectual collaborators in developing meaning-based (literacy) instruction". In this study, the collaboration of the teachers through the use of the after-school study group was an innovation which led to exciting changes in the structure of classroom instruction, and to development of units that brought in content areas relevant to students' experience. The collaboration also led to the utilization of the home community resources, which in turn strengthened linkages between home and school. Thus the teacher study-group, involving collaboration of teachers from different classrooms and even different schools, offers a promising alternative for promoting classroom changes that lead to more effective literacy instruction for language minority students.

CHECHE KONNEN: COLLABORATIVE SCIENTIFIC INQUIRY IN LANGUAGE MINORITY CLASSROOMS

Design and Goals

"Cheche Konnen" is a Haitian Creole term meaning "search for knowledge." The Cheche Konnen approach to science teaching and learning emphasizes active inquiry, student collaboration, and interdisciplinary learning. It engages language minority students in scientific activities which are personally relevant, socially meaningful, and academically demanding.

The goal of Cheche Konnen was to test how an investigation-based approach to science and math instruction works with language minority students who have little experience with science and/or who have had little formal schooling. The approach "emphasizes not only the reasoning processes and conceptual knowledge that fuel the activities of science and mathematics ... but also the social and linguistic processes that mediate them" (Rosebery, Warren, & Conant, 1989, p.1).

Activities for Students

The Cheche Konnen approach was implemented in an urban setting in three different classroom environments: in bilingual and mainstream kindergarten classrooms, in a middle school Haitian bilingual class, and in a multilingual high school class. The middle school students ranged from those functioning approximately two years below grade level to those who could not read or write in either language — Haitian Creole or English. The multilingual high school class consisted of students at greatest risk for dropping out of school; part of a Basic Skills Bilingual program, they were classified as students with low academic skills, very limited English language skills, and little or no experience with science.

Using the interdisciplinary "investigation-based" approach, the students worked as scientists: they posed questions, formulated hypotheses, and built theories; they collaborated with one another and with teachers in collecting, analyzing and interpreting data; and they prepared reports on their work for interested audiences. In this way, the students began to see science as a method for answering important questions rather than as an inventory of "already-discovered facts." The approach was interdisciplinary because it emphasized the use of literacy skills and used mathematics and computers as tools for explaining and communicating scientific findings.

Students investigated a range of questions focused on their local environment. For example, the kindergarten students studied the local weather by collecting daily statistics over several months on clouds, wind, precipitation, and temperature. They then examined the data for patterns and built theories to explain them.

At the middle school one thematic focus of study was water. As a starting point, students defined a problem that they were interested in investigating. For example, school legend — or belief — had it that water from the third floor fountain was "the best." The students decided to test this belief using a blind taste test. They worked collaboratively, assigning each other the various tasks required to conduct their investigation. They conducted a blind taste test of the school's three drinking fountains. To their surprise, they found that the water from the first floor, the one that according to the school legend was the worst, was preferred by most people. They then wanted to know <u>why</u> it was preferred and went on to analyze the water for temperature, bacteria, and salt content. They prepared reports, tables, and graphs on their findings. Finally, the students made a summary report to the entire school.

Using similar collaborative inquiry techniques, the high school class conducted an extensive analysis of a local pond, studying its biology, chemistry, and ecology. They planned and carried out field studies of microscopic aquatic life, developed a hydogeologic profile of the pond, and analyzed its various chemical and physical properties including acidity, dissolved oxygen, carbon dioxide levels, and temperature. The product of the investigation was a field guide of the local aquatic system that they prepared for elementary school students.

- Activities for Teachers

A central component of Cheche Konnen was the teacher enhancement process. The researchers recognized that in order to implement a collaborative inquiry approach, they first had to make teachers comfortable with the scientific subject matter and inquiry practices. The aim of the teacher enhancement program was three-fold: to encourage teachers to use varied sources for science teaching, ending their sole reliance on textbooks, to encourage teachers (bilingual and ESL) to move beyond simply teaching scientific vocabulary, and to encourage teachers to change from teacher-centered, worksheet-based teaching to student centered inquiry. The researchers worked closely with the classroom teachers in several ways: helping them develop scientific knowledge and inquiry skills, collaborating with them in developing investigations, and working with them in their classrooms as they engaged their students in investigation-based science.

Observations and Findings

"Cheche Konnen" researchers analyzed first year data with the goal of exploring "the relationship between learning science and developing literacy." They demonstrated how the approach "transformed the kinds of science and literacy" being practiced in the classroom from "traditional worksheet-based practices to authentic, communicative, sense-making practices." Their analysis led them to conclude:

with respect to teaching:

> ... changes in teachers' classroom practices requires a change in the culture of teaching and learning itself. The value of alternative practices must be demonstrated and experienced in contexts that are specifically designed to promote such practices over traditional ones (Warren & Rosebery & Conant, 1989, p. 54).

with respect to student's learning:

> ... knowledge, or what students learn, is inextricably tied to the ways in which it is learned ... robust learning, whether in a discipline such as science or in language, grows out of purposeful engagement with complex, ill-defined problems rather than mastery of oversimplified and decontextualized facts and procedures.

with respect to instructional programs:

> ... there is [a] ... [strong] impulse toward oversimplification and decontextualization than in mainstream education programs, owing to the concern with developing students' English skills. But these pedagogical strategies are based on faulty assumptions about the students' communicative and reasoning abilities and results in the setting of artificial limits on what they can achieve (Warren & Rosebery & Conant, 1989, p. 54).

with respect to the tension in goals between language instruction and subject matter instruction:

> ... language minority students [are] capable of meeting the intellectual challenge posed by authentic scientific activity ... this activity itself is capable of resolving the tension between disciplinary learning and language development ... (Warren & Rosebery & Conant, 1989, p. 54).

Cheche Konnen sought to address these problems by changing the nature and purpose of science instruction. Cheche Konnen assumed that students want to investigate the world around them and are capable of developing theories and devising data collection approaches which are relevant to their work.

The Cheche Konnen model was highly successful as evidenced by the changes in both student and teacher behavior. Through collaborative inquiry, the students learned to formulate hypotheses and explanations based on empirical evidence (Rosebery, Warren, & Conant, 1990). They gained a deeper knowledge and appreciation of science and improved their reading, writing, mathematics and computer skills. The teachers learned to guide rather than direct the students as they joined with the students in carrying out the investigations.

COMMON THEMES OF THE IARP MODELS

Despite the diversity in topic areas and in types of interventions, the four IARP research and demonstration models showed a striking and significant consistency in the types of program components linked with effectiveness of instruction. The components that were independently identified by each model represent cross-cutting themes that have significant implications for school organization and the teaching/learning process. The results found in each of the IARP models share an emphasis on three main themes:

- First, the IARP models demonstrated the value of restructuring schooling to open up lines of communication among staff, programs, classrooms, and even schools.
- Second, the results of the models showed the value of using teaching and learning approaches that promote active participation and cooperation among students, and that recognize the contribution that students can bring into the classroom.

- And, third, the models showed the importance of providing language minority students with instructional content that is challenging and that is culturally and personally relevant.

Through these main themes, the IARP models jointly suggest new ways of thinking about instruction and individually offer some challenging ideas about more effective ways to structure schooling and the teaching/learning process. In this section, we discuss the cross-cutting themes and reflect on their implications for the instruction of language minority and other students.

Restructuring Schooling

Throughout the implementation of the IARP research and demonstration projects, typical boundaries that existed within schools were crossed or broken down. The resulting increase in communication and collaboration among all school staff — bilingual and mainstream personnel — was an important factor in the success of the models. These innovations in school structure led to significant modifications in the classroom and ultimately to a transformation in students' attitudes and performance.

With regard to classroom practice, the restructuring of schooling refers to:

- the relationship between the process of collaboration and innovative practices:
- the relationship between innovative practices in the classroom and traditional or "commonly practiced" instructional policies;

and, with regard to school organization, the restructuring of the schooling process involved changes in:

- the relationship among schools and among classrooms within a school; and,
- the relationship between schools and communities.

As described below, the experience of the IARP models focused attention on new ways of thinking about these aspects of schooling and each model offered new alternatives for structuring these relationships.

Relationship Between the Process of Collaboration and Innovative Practices

Without exception, all four of the IARP models included a new role for teachers; this was an expanded role in which teachers worked together to develop and to in fact define the specific application of the innovative model in their classrooms. That is, while typically teachers function independently, in the IARP models teachers collaborated with each other and with the researchers to work through and test ideas for working with their students. The process of collaboration was actually as much a part of the innovative practices as the classroom applications of the models, and played a significant part in the success of the models.

The collaboration gave teachers a forum in which they could voice their ideas for innovation and find mutual support and assistance in working out these ideas. The collaborative approach both made teachers themselves more receptive to change and created a strong base for change within the

school. For example, the Community Knowledge and Classroom Practice model demonstrated how teachers could work collaboratively, supporting each other in the development of innovative methods in their classroom and sharing in problem-solving. The teachers in the after-school study group gradually began to work as a team in devising better ways to address the needs of their students; at the same time they began to share the excitement of creating together new, more effective teaching/learning approaches for their classrooms.

By breaking out of the traditional isolated mode of working, the individual teachers were able to become more adventurous in their methods; they were able to try out approaches they might not otherwise have undertaken without the support of the other teachers' advice and reactions. Moreover, several of the teachers became "mentors" for innovation and instilled within other teachers a receptive attitude toward innovation.

Also, in each model, it was clear that collaboration should not be limited in scope to the teaching staff. In implementing the models, the support of administrators within the schools was crucial. Principals, program directors, and other administrative persons not only need to be kept informed, as a minimum requirement, but they need to be invited to take part in any of the training and development activities involved in the implementation of an innovation. When there is awareness on the part of the administrators regarding program components and, later, regarding the outcomes observed in the implementation of an innovative model, a stronger partnership for change develops in the school.

Relationship Between Innovation and Traditional Instructional Policies

The IARP models also broke down walls constructed around teachers by school policies and traditional training. Educators working on the IARP models were challenged to rethink what teaching is about, how they approach students, what role the established curriculum should have, and how school policies affect the teaching/learning process.

Sometimes existing policies or common practices needed to be modified so that the innovations could take place. For example, the PVY dropout prevention model arranged payment for student tutors and offered them course credit, both of which were new practices for the district. In addition, some administrators and staff were not sure that it was appropriate to assign tutoring responsibility and provide compensation for tutoring to "at risk" students. The results of the PVY model, however, demonstrated that these modifications made possible a program that led to significant changes in the performance level, attitudes and goals of the student tutors.

In the AIM for the BESt model, the researchers noted how state mandates affected the willingness of the teachers to use new approaches:

> Not only are goals and objectives specified, but the amount of time which must be devoted to each content area is specified. Mastery of the "essential elements" of the curriculum are then measured by a state-wide student competency examination.

> While teachers seem to see the value of ... [the new] approach ... achievement tests seem to be more consistent with transmission-oriented, skill-specific teaching ... [Teachers are reluctant] ... even though the project has the full support of the superintendent, the bilingual education and special education director, and the school principals (Ortiz, Wilkinson, & Bergman, 1990 p. 32).

However, as the staff members involved in implementing the Aim for the Best became more confident in the effectiveness of the model components, and began to see the results of the instructional innovations in the classroom, they increasingly became advocates for change. The collaboration among the teachers and of the teachers with researchers initiated support for innovation and a basis for change within the school that went beyond individual classrooms.

Relationship Among Schools and Classrooms

The IARP models defied traditional ways of thinking about schools and classrooms in several different ways. While the traditional structures are ones wherein teachers from different schools seldom interact with one another and teachers within a school typically work in isolation, within the IARP models these traditional structures were changed.

The PVY dropout prevention model broke down the traditional walls between schools. The junior high student tutors were able to interact with younger students and their teachers because the necessary linkage and arrangements between the middle and elementary schools had been made. The result of this new linkage was beneficial to both the tutors and the elementary school tutees.

The multidisciplinary approach in Cheche Konnen broke down strict divisions between disciplines and the highly structured school day which devotes blocks of time to "learning" those disciplines. In the Cheche Konnen model, science, language, and mathematics were viewed as complementary aspects of learning to think. The research collaborators noted that: "The approach emphasizes not only the reasoning processes and conceptual knowledge that fuel the activities of science and mathematics ... but also the social and linguistic processes that mediate them" (Rosebery, Warren, & Conant, 1989, p.1). The result of the approach was the creation of instructional sessions in which science learning, math learning, and language learning were occurring together, with learning in each area providing support for building in the other.

The exceptional student model also broke down traditional barriers. The Student/Teacher Assistance Team (S/TAT) process and the CBA processes helped to break down walls not only between classrooms but between special education and regular teachers. The S/TAT teams, as we have described, consisted of teachers and other staff, and were charged with providing assistance in cases of students with problem behaviors. These teams ultimately helped to break down barriers that had existed between program categories in the school and helped to improve communication among resource personnel about the needs of all students, including language minority students. The use of the S/TAT led to improved and more appropriate instructional services for language minority students

and greater understanding among teachers of how best to assess performance and plan instruction for these students.

Relationship Between the School and the Community

In general, little attempt has been made to build a bridge between the culture of schools and the culture of the community from which students come (Heath, 1983; MIT, 1990). The recognition that instruction must have a link to the real world in order to be meaningful to students represents a fundamental principle and theme in the IARP.

This theme was made most explicit within the literacy model, Community Knowledge and Classroom Practice. Teachers implementing the intervention drew on information gained from the findings of the ethnographic study of households. Through the after-school lab and teacher study group, they supported one another in experimenting with a meaning-centered model of reading that drew from an understanding of ways literacy is used in the community and in the home.

In Cheche Konnen, a science problem or question was viewed from both perspectives: the perspective of the "home culture" and the perspective of "science." In one problem, students were asked to reflect on the causes of an epidemic illness. Early in the term, students noted the traditional "folk" or "magical" explanations; later in the term, the students were also able to provide the "scientific explanation."

Effective Teaching/Learning Approaches for Language Minority Students

Although the IARP models were developed independently of each other, the types of teaching approaches used in each were remarkably consistent. Apparently, several research collaborators working independently came to the same conclusion: Teaching that involves both teachers and students in meaningful learning tasks, and student learning tasks in which students work cooperatively and take greater responsibility for their own learning, lead to more effective learning outcomes for students.

While the exact mix of approaches and the specific forms they took in implementation were different in each model, all four IARP models made use of a combination of participatory teaching and cooperative learning approaches. In addition, each model took steps to ensure that the content of learning was relevant to the students' background, knowledge and needs. In the IARP, the use of these types of approaches within the interventions may have served to help in breaking down traditional barriers (Lara & Hoffman, 1990) for language minority students.

Participatory Teaching/Learning

IARP models encouraged teaching that favored active participation on the part of students. Participatory learning is important for language minority students because it:

- acknowledges individual learning styles;
- encourages positive interdependence among teachers and students;
- allows students to frequently practice language skills and to use newly acquired knowledge in meaningful ways;
- provides teachers with immediate and important feedback on what students are learning; and,
- allows students to integrate their unique cultural and personal perspectives into classroom instructional activiteis.

The use of a participatory approach was important to each of the four IARP research and demonstration models. For example, Cheche Konnen included a variety of student-defined and student-initiated activities. The emphasis for the student was on interpreting what they already knew, identifying what were logical and meaningful extensions of that knowledge, and finding ways in which students could most effectively gain new knowledge and skills. The students in AIM for the BESt improved their literacy skills through the use of interactive techniques such as language experience stories, journal writing, and shared book experiences.

The activity-based approach employed in the Community Knowledge model made students active learners; through the literacy activities the students developed literacy skills as a tool for communicating and thinking. Reading and writing in English or Spanish occurred as a means of analysis and expression rather than as a narrow academic exercise. The teachers' role was to guide literacy activities which involved students as thoughtful learners in socially meaningful tasks.

In the Partners for Valued Youth model the student tutors were responsible for creating teaching materials to teach basic skills to younger students; as they did so, they strengthened their own basic skills. The tutoring sessions also made learning more participatory for the younger students: they became less inhibited about expressing themselves in the tutoring environment than they were in the typical classroom situation.

Cooperative Learning

Cooperative learning has been shown to be an effective pedagogical tool and is particularly appropriate for language minority students, many of whom come from cultural groups where cooperative approaches are highly valued (Cochran, 1989; Jacob & Mattson, 1987; Kagan, 1986; Solis, 1988). Researchers have generally noted important advantages of cooperative learning approaches for language minority students:

- High levels of interaction and communication stimulate students to use cognitive and oral English language skills productively;
- Students with heterogeneous knowledge and skill levels help one another to learn and apply knowledge;
- Students' self-confidence and self-esteem is enhanced through individual contributions and achievement of group goals; and,
- Individual and group relations in the classroom are improved through students' learning to clarify, assist, and challenge each other's ideas.

When we speak of cooperative learning, we refer to an approach to classroom instruction that is student-centered and that creates interdependence among students and teachers. In classrooms where cooperative learning is utilized, students work collaboratively on common academic tasks or problems. Cooperative learning may take a number of forms, such as peer tutoring, group models, class presentations, etc. Within the IARP models the use of cooperative learning was based on the premise that students and teachers have considerable resources to offer each other and that those resources should be used in the teaching/learning process. The IARP research and demonstration models thus made extensive use of cooperative learning in various forms. In fact, cooperative activities were integral to most of the classroom instruction carried out within the four models.

In Cheche Konnen, students cooperatively designed and carried out investigations to examine empirically-based problems — such as the water taste test. Groups of students determined the different tasks to be accomplished, assigned responsibility for these tasks to each other, and in this way produced surveys, analyses, and written reports of their investigations.

The training of tutors in Partners for Valued Youth included cooperative learning activities; the student tutors shared their different experiences and problems in their support sessions and worked cooperatively to learn the best ways to teach the younger students.

AIM for the BESt employed the Graves Writing Workshop, a cooperative approach to writing whereby students write collaboratively and use reactions and critiques from peers in learning to revise their own writing.

In Community Knowledge, one teacher extended a cooperative environment throughout the instructional day. In her "Sunshine Room," various sections of the room were set aside for cooperative activities through which students learned to collaborate in story-telling, in writing, and in researching a variety of topics.

The Content of Instruction for Language Minority Students

The third main theme shared by the IARP models was that the content of instruction presented to language minority students must be at a challenging level, and that it should be culturally and personally relevant to the students.

Challenging Level of Instructional Content

Frequently, the content of instruction provided to language minority students is reductionist and instructional activities are focused on lower order skills such as rote learning. However, lack of full proficiency in English does not and should not limit students to learning only content that requires lower order thinking skills. Instead, as was shown by the experience of the IARP models, when teachers have high expectations and present academic tasks that are more complex and challenging, students become engaged in and challenged, and instruction begins to tap their true potential for learning.

For example, in Cheche Konnen, language minority students developed an understanding of the scientific method of approaching problems and questions and began to function as scientists, developing and testing hypotheses, and forming conclusions based on their investigations. The products of the investigations and the outcomes in terms of the students' understanding of science fully justified the use of this type of approach. In addition, the outcomes were so impressive that assumptions about these students' levels of ability on the part of other teaching staff were revised. And, more importantly, the students' own perceptions of their abilities were changed, giving them a more positive approach to learning.

Culturally Relevant Learning

As a second aspect of instructional content, within the IARP models there was an emphasis on the importance of content that is culturally and personally relevant to students. Some of the benefits of such culturally based instruction are (Cazden & Legget, 1981; Kagan, 1986; Tikunoff, et al, 1981):

- It works from the basis of existing knowledge, making the acquisition and retention of new knowledge and skills easier;
- It improves self-confidence and self-esteem of students by emphasizing existing knowledge and skills;
- It increases the likelihood of applying school-taught knowledge and skills at home and in the communities represented by the students; and,
- It exposes students to values, information, and experiences about other cultural and language groups.

But the advantages of culturally relevant learning are not necessarily easy to achieve; and traditionally, there have been obstacles to implementing a culturally relevant approach. Several objections are frequently voiced in policy dialogues about culturally relevant learning:

- There is not sufficient information about the personal and cultural experiences of the students available to the teachers;
- Written curricular materials which are culturally relevant are not conveniently accessible or immediately available;
- Teachers may believe that integration into the majority culture is a more important objective than culturally-relevant learning; and
- Teachers with more than one non-English language group in the class may consider culturally-relevant learning impractical.

Yet IARP models did successfully employ culturally relevant learning approaches and their examples offer some insight into the ways traditional obstacles might be overcome. One way the IARP models overcame objections and obstacles to the use of culturally relevant instruction was by conscientious effort to involve the community more thoroughly in the classroom.

The PVY model relied on parental and community involvement. It provided training to the parents and engaged them in the overall strategy of drop-out prevention. The research collaborators noted that successful program seeks out role models from the language minority group and highlights them in programs.

In Cheche Konnen the researchers acknowledged the "home culture" explanations and observations of phenomena and examined these as part of the process of learning about scientific method. The teachers and researchers also kept a focus on students' understanding the characteristics of scientific discourse, without requiring its expression in any one language; thus, by accepting a fluid lingua franca in the classroom — sometimes English, sometimes Creole and sometimes an African dialect — they were at the same time demonstrating that scientific thinking is relevant and constant across all of the languages used.

The research collaborators in Community Knowledge first documented the funds of knowledge within the Hispanic community and then demonstrated how this knowledge base might be useful in classroom instruction. The AIM for the BESt model sought to make teachers and counselors aware of linguistic and cultural differences and their role in the classroom performance and behaviors of language minority students. Through the use of the model, this knowledge became an important reference point when evaluating a student's need for special educational services.

As these examples show, the IARP models emphasized the important interrelationships among home, school, and community. Thus, the IARP interventions provided structures through which students' backgrounds, interests, and values were respected and utilized.

CONCLUSION

The objective of the Innovative Approaches Research Project was to define promising new directions in the education of language minority students. The project identified four innovative models, each of which had been developed out of a broad research base and provided a new approach to effective instruction of language minority students. The major concern in each of the models was to raise students' levels of academic performance and literacy skills.

The outcomes of the two years of research and demonstration are significant in two ways. First, the IARP models were each demonstrated to have a positive impact on students and, importantly, on the classrooms and schools involved as well. Each of the four models thus offers a specific innovative alternative to educators for addressing the instructional needs of their language minority students. Second, the findings of the IARP models together offer important insights regarding the structure of schooling and regarding effective instructional approaches for language minority students. The IARP experience points clearly in the direction of opening up many channels of communication: those among students and teacher in the classroom; those among teachers and other staff within a school and across schools, and those between the school and the community.

The focus on instructional process is on student-centered classroom interaction patterns, with students participating in the development of a topic or problem and its resolution, as opposed to a model in which students most typically receive information presented by a book or by the teacher. The curricula promoted by the IARP models are consistently those that focus on content that is challenging and that is shaped by the needs and interests of the students under the guidance of the teacher. The models move away from, for example, a dependence on basal readers, or primary emphasis on rote learning.

These changes, of course, open up new avenues for the teacher, ones in which the individual teacher is given more initiative in the structuring of the classroom environment and in determining the range of possible classroom endeavors. At the same time, the results suggest the benefits of greater collaboration among teachers in defining and structuring classroom activities. Many of the changes recommended by the IARP models, however, can also place the teacher in conflict with needs and requirements as defined by school and district policies. Thus, the results of the four IARP models offer a basis for renewed examination of issues that are increasingly coming to be recognized as important to the achievement of students in our schools.

Finally, although the IARP models were focused on the instruction of language minority students, they should not be considered as limited only to such students. The principles and program components found in the models are expected to be valid for non-language minority students as well. All four of the IARP models will continue to be implemented. AIM for the BESt and Cheche Konnen will be funded by the Department of Education under the IARP for an additional academic year. Partners for Valued Youth and Community Knowledge and Classroom Practice will continue under private funding. Two of the projects, Community Knowledge and Cheche Konnen, are also receiving support under the Department of Education-funded Center for Cultural Diversity and Second Language Learning. Therefore, further results on all four of the models will be available to continue to inform educators interested in the innovative approaches that each represents. And, through the distribution of the handbooks and other information on the four models, it is hoped that results from the experience of others in replicating the models will also become available to further inform and shape effective instruction of language minority students.

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